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GROUNDSTROKE EXERCISE COMBINED WITH JOGGING CAN INCREASE THE PHYSICAL FITNESS OF TENNIS PLAYERS

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ABSTRACT

This research study aims to determine how much of program contribution given in combination with aerobic anaerobic exercise to increase physical fitness of tennis players. The anaerobic exercise program given a blow to the forehand and backhand groundstrokes alternately 6-8 times as many punches. While aerobic exercise program of jogging around the pitch tennis. This research used quasi experiment design with the one group pretest-posttest design. The study population was students PAB DIY tennis. The research sample was determined randomly by lottery groups, in order to obtain research samples of all the students are practicing DIY PAB tennis in Bantul were 13 children consisting of 10 child-sex male and 3 female children. The instrument used is a multistage test to measure cardiorespiratory capacity (VO₂ max) or physical fitness. Analysis used t test to determine whether there are differences between pretest and posttest variables in the experimental group. Results of analysis showed that the $\{t \mid t < -2.160 \text{ or } t > 2.160\}$ and $\{t = -9.279 \text{ or } 9.279\}$ with significance level $P = 0.000 < 0.05$ means that there are significant differences between pretest to posttest. So we can say that exercise can improve groundstrokes combination of jogging, physical fitness students BAO DIY tennis.

Keywords: exercise groundstrokes, jogging, physical fitness

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INTRODUCTION

The development of tennis sport today has increased significantly. It can be known by the increasing public interest in Indonesia to play tennis. The same can also be confirmed with the birth of junior tennis players, tennis players that are reliable in playing tennis. It can also be seen from the government's role in conducting intensive training of gifted students. Increased public interest against the game of tennis was a result of the increasing awareness of the importance of the exercise to improve physical fitness and health.

Physical fitness is the ability of a person's body to perform the duties and daily work without causing significant fatigue, so the body still has a reserve power to cope with additional workload (Adisapoetra et al. 1999). In addition, physical fitness can also be interpreted as one's ability and physical ability to perform daily tasks effectively and efficiently in a long time without causing significant fatigue, and still have a reserve power to conduct other activities (MOEC 1997).

In general it can be seen that every human physical activity requires energy. Similarly, practicing or playing tennis also requires energy. Basically there are two

systems of energy needed to move the aerobic and anaerobic. When playing tennis the energy can be obtained from the two systems. The most widely used aerobic energy when playing tennis. Therefore we need the right form of exercise to train the cardiorespiratory capacity for aerobic energy acquisition system will be used by players with good.

When playing tennis, a tennis player must have good biomotor ability. According to Bompa (1994) biomotor components which have an important role on the performance of athletes in competing in them is strength, endurance, speed, coordination, and flexibility. The examples of biomotor exercise are jogging, weight training, stretching, and exercise coordination between the eyes, feet and hands. Biomotor component is necessary in the process of training for print tennis player. In fact biomotor component is often overlooked in the process of training, whereas this component has a very important role in the appearance of a tennis match. In this biomotor training process can be combined with engineering practice in a game of tennis with the aim to vary the exercises to avoid boredom during practice.

Tennis game includes some aspects of certain techniques, such as: blow groundstrokes forehand and

backhand covering, service, volley, lob, and smash. In order to become a reliable and professional tennis player should be a tennis player should be able to master some aspects of these techniques. In addition to professional tennis player must have variations in the technique to play tennis. In game of tennis mastery of technique alone is not sufficient, but must be balanced with a dose of proper exercise and conducted intensive training to develop the technique. In addition to master the technique well, a tennis player should also have a good cardiorespiratory capacity. Therefore we need variations proper exercise to improve physical fitness.

The need for physical fitness in tennis players is when the increased activity of large muscles because the exercise causes increased oxygen consumption, it is clear that the large muscles should be used to achieve maximal oxygen consumption. In other words, a tennis player will be unable to maximally consume oxygen when only a technical exercise only. It must be combined with physical activity that involves a lot of big muscles to generate greater oxygen consumption.

The ability to supply oxygen to the body must be accompanied by lung resistance and a good heart. Of the various types of exercise recommended, jogging is a sport that has been chosen to train the heart and lung endurance. Jogging was chosen because simple movements, can be done by everyone with ease, does not require facilities difficult, and can train the heart lung endurance. However, jogging activity is still lacking the monotonous movement making it very easy to cause boredom, lack of exercise stress on certain muscle groups so there are less specific, it is thus required a variety of exercises for preventing boredom. The variation of exercises will include game training techniques in sport combined with jogging. This needs to be done so in the process of training to achieve physical fitness is not experiencing excessive boredom.

MATERIALS AND METHODS

This type of research used in this study was quasi experiment design by using the one-group pretest-posttest design. According to Leedy (1980: 169) the one-group pretest-posttest design is a type of experiment Nowhere has a single group (1) a pre-experimental evaluations, Than (2) the influence of the variables, and, finally (3) a post-experimental evaluation. From the above opinion can be said that the one-group pretest-posttest design is a form of experimental studies where one group into an evaluation before the experiment, then give the effect of the variable and finally provide an evaluation after the

experiment. So it can be said that the pretest results of this research is the control.

The population in this study was students PAB tennis DIY Province. Tennis club PAB DIY Provincial Education Department has 26 children registered members are divided into two gym that is in the Bantul district of Yogyakarta to the area of Gunungkidul, Bantul and Kulonprogo and at the Faculty of Sport Science, State University of Yogyakarta to the area of Sleman and Yogyakarta City. The sample in this study randomly was assigned by lottery group. After the draw the sample obtained from BAO students who practice in Bantul. The study involved all students PAB DIY tennis training in Bantul was 13 children consisting of 10 child-sex male and 3 female children. The results are in can then be correlated to the physical fitness norm table (Table 1).

Table 1. Physical Fitness Norms of cardiorespiratory function

No.	VO2 max prediction (ml/kg.bw/mnt)	Categories
1.	≥ 45.01	Very good
2.	38.34 – 45.00	Good
3.	31.67 – 38.33	Moderate
4.	25.01 – 31.66	Bad
5.	≤ 25.00	Very bad

Source: Hermawan (2001).

RESULTS

Cardiorespiratory ability test (VO2 max) performed with a multistage test. Given the treatment of aerobic exercise combined with a technique performed by the frequency of exercise three times a week and do as much as 24 times the meeting. Also in the process of training should be carried out for 25 minutes with exercise intensity 75% - 85% maximum heart rate.

From the pretest data cardiorespiratory capacity (VO2 max) is interpreted in the form of physical fitness categories based on norms. Then obtained by 6 people have physical fitness is and 7 people have less physical fitness.

After treatment it is given in cardiorespiratory ability to posttest data (VO2 max), and then interpreted in a physical fitness norms table. Of these norms in his physical fitness to 4 persons included in either category, 7 people have physical fitness is and 2 people have less physical fitness.

Table 2. Pretest and posttest data on cardiorespiratory capability (VO2 Max)

No.	Age (years)	Rev. Level	Pretest VO ₂ max (ml/kg.bw/minutes)	Rev. Level	Posttest VO ₂ max (ml/kg.bw/minutes)
1.	15	6.2	33.6	7.7	38.8
2.	12	4.1	26.2	6.1	33.2
3.	11	4.9	29.7	5.7	32.1
4.	13	3.7	25.3	5.1	29.9
5.	14	6.6	35.0	8.9	42.7
6.	14	6.3	33.9	8.1	40.2
7.	13	5.7	32.1	7.1	36.7
8.	13	5.5	31.4	6.4	34.3
9.	11	6.10	36.4	7.8	39.2
10.	8	4.1	26.2	5.5	31.4
11.	15	5.2	30.2	7.2	37.1
12.	14	4.9	29.7	5.6	31.9
13.	11	5.7	32.1	6.1	36.4

Table 3. The frequency of cardiorespiratory function and Physical Fitness

No.	VO2 max Prediction (ml/kg.bw/mnt)	Frequency	Categories
1.	≥ 45.01	0	Very Good
2.	38.34 – 45.00	0	Good
3.	31.67 – 38.33	6	Moderate
4.	25.01 – 31.66	7	Bad
5.	< 25.00	0	Very bad

Table 4. Physical Fitness Norms cardiorespiratory function

No.	VO2 max Prediction (ml/kg.bw/mnt)	Frequency	Categories
1.	≥ 45.01	0	Very Good
2.	38.34 – 45.00	4	Good
3.	31.67 – 38.33	7	Moderate
4.	25.01 – 31.66	2	Bad
5.	< 25.00	0	Very bad

The mean pretest scores cardiorespiratory ability of 30.9077 with a standard deviation of 3.48077. While the mean posttest scores cardiorespiratory ability of 35.6769 with a standard deviation of 3.9058. If the average scores are interpreted in the form of physical fitness categories based norms can be said that the average pretest included in the category of less fit. After

a given treatment combination groundstrokes jogging exercise, the importance of the posttest mean of 35.6769 which is included in the medium category.

T test conducted to determine whether there is any difference in VO₂ max between pretest and posttest in the experimental group. The result analysis revealed significant difference if the significance value less than 0.05 ($P < 0.05$). Based on analysis of cardiorespiratory capacity shows that $\{t | t < -2.160 \text{ or } t > 2.160\}$ and $\{t = -9.279 \text{ or } 9.279\}$ with significance level $P = 0.000 < 0.05$. There are significant differences between pretest to posttest. Based on the results of the analysis was the ability of cardiorespiratory posttest better than at pretest.

DISCUSSION

Variations of effective training programs to improve cardiorespiratory can be done in the sport of tennis game, because in the sports game of tennis is not only skills are needed, however, cardiorespiratory capability is also very necessary to be able to play tennis well. This variation is a combination of anaerobic and aerobic exercise in the treatment of groundstrokes combined with a jogging exercise.

The research has been done shows that the physical fitness of the 13 test participants has increased significantly. This can be seen from the significant level of less than 0.05 is 0.000. Empirical facts of the results showed the mean at pretest cardiorespiratory capacity (VO₂ max) is 30.9077 with a standard deviation of 3.48077, the mean is included in the category of less fit. While the average cardiorespiratory capacity (VO₂ max) on the posttest is 35.6769 with a standard deviation of 3.9058, the mean is included in the medium category.

Based on the results of research that has been done, it shows that there is a difference between the mean pretest and posttest, so that it can be said that the physical fitness test participants experienced significant improvement. Improved results can be seen if the calculated difference between the mean pretest and posttest is $35.6769 - 30.9077 = 4.7692$. So it can be concluded that a combination of jogging exercise groundstrokes to increase cardiorespiratory capacity of 4.7692 or 7%.

Exercise groundstrokes jogging combination can be used as a means to improve physical fitness, because in this exercise process that uses a combination of anaerobic to aerobic energy. A person can be said to fit when able to perform physical activity in daily life without feeling excessive fatigue. If the combination of

jogging exercise groundstrokes carried out in accordance with the appropriate dose in this case includes the frequency, intensity, duration and training model, it will be to increase the physiological capabilities. Along with the increased ability of physiological then physical fitness will increase and influence to improve health.

The data showed that there was an increase cardiorespiratory capacity increase cardiorespiratory capacity (VO₂ max) occurs because in practice a combination of jogging groundstrokes are very related to the use of oxygen involving cardiorespiratory function. The exercise ball is hit forehand and backhand as much as eight times without stopping and then followed by jogging around the field while collecting the ball that had hit them.

From the study, it can be seen that the practice groundstrokes jogging combination is a combination of aerobic and anaerobic exercise, which at the time of this physical activity using energy from aerobic glycolysis system and also obtained from ATP and creatine phosphate. The main energy requirements are required when playing tennis using aerobic energy, but at the time of punch it is the dominant anaerobic energy systems. It could be argued that at the time playing tennis dominant energy using anaerobic energy system, but also in aerobic energy needed to be able to obtain energy from oxygen. Therefore, a tennis player besides mastering stroke techniques in tennis games should also have the ability to inhale as much oxygen as possible. So groundstroke combination with jogging exercise is an alternative exercise to improve physical fitness.

Increased cardiorespiratory ability also caused by the load or dose of exercise carried out in accordance with a dose of proper exercise. The ability of cardiorespiratory fitness is a component of the most important, so it can be said that the cardiorespiratory endurance of heart or lung may represent the level of physical fitness of a person, means the better the ability of the heart-lung endurance someone better his physical fitness level.

CONCLUSION

Exercise groundstrokes combination could improve physical fitness jogging at 4.7692 or 7%. So the model variations of this exercise can be made to promote physical fitness of the tennis players.

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